

WHAT IS CLAIMED IS:

1. A charged-particle-beam exposure apparatus for exposing a substrate using a charged-particle-beam, comprising:

5 a charged-particle source for emitting a charged-particle beam;

a detecting unit configured to detect intensity of that part of the charged-particle beam, which has been emitted from said charged-particle source, in an
10 area not utilized in exposing the substrate; and

an adjusting unit configured to adjust intensity distribution of the charged-particle beam based upon result of detection by said detecting unit.

2. The apparatus according to claim 1, wherein said
15 adjusting unit adjusts optical power of electrostatic lenses that construct a collimator lens for substantially collimating the charged-particle beam that has been emitted from said charged-particle source.

20 3. The apparatus according to claim 1, further comprising a storage unit configured to store, as a reference value, the intensity detected by said detecting unit in a state in which the intensity distribution of the charged-particle beam can be
25 regarded as uniform;

wherein said unit adjusts the intensity distribution of the charged particles based upon a

difference between the intensity detected by said detecting unit and the reference value.

4. The apparatus according to claim 3, wherein said adjusting unit adjusts the intensity distribution of the charged-particle beam in such a manner that the intensity detected by said detecting unit will become the reference value.

5. The apparatus according to claim 3, further comprising:

10 a measuring unit configured to measure the intensity distribution of the charged-particle beam on the substrate to be exposed; and

a setting unit configured to set the intensity of the charged-particle beam, which has been detected by said detecting unit, to the reference value after the intensity distribution of the charged-particle beam has been adjusted to uniformity based upon the intensity distribution measured by said measuring unit.

15 6. The apparatus according to claim 3, wherein said adjusting unit halts processing for exposing the substrate and executes adjustment of the intensity distribution of the charged-particle beam if the difference between the intensity detected by said detecting unit and the reference value exceeds an allowable value.

20 7. The apparatus according to claim 1, further comprising a plate having a plurality of apertures for

dividing the charged-particle beam from said charged-particle source into a plurality of charged-particle beams used in exposing the substrate;

wherein said detecting unit detects the intensity
5 of the charged-particle beam, which irradiates said plate, at a plurality of locations in a portion where the plurality of apertures are non-existent.

8. The apparatus according to claim 1, further comprising a stencil mask for allowing the charged-particle beam from said charged-particle source to
10 pass through in accordance with a pattern and expose the substrate;

said detecting unit detecting the intensity of the charged-particle beam at a plurality of locations
15 in an area of the stencil mask other than an area in which the pattern is present.

9. A method of controlling a charged-particle-beam exposure apparatus for exposing a substrate using a charged-particle beam, comprising:

20 a detecting step of detecting, by a detector provided for the purpose of detecting intensity of a charged-particle beam, intensity of that part of the charged-particle beam, which has been emitted from a charged-particle source, in an area not utilized in
25 exposing the substrate; and

an adjusting step of adjusting intensity distribution of the charged-particle beam based upon

result of detection at said detecting step.

10. The method according to claim 9, wherein said adjusting step adjusts optical power of electrostatic lenses that construct a collimator lens for

5 substantially collimating the charged-particle beam that has been emitted from the charged-particle source.

11. The method according to claim 9, further comprising a storage step of storing, as a reference value, the intensity detected by said detector in a

10 state in which the intensity distribution of the charged-particle beam can be regarded as uniform;

wherein said adjusting step adjusts the intensity distribution of the charged particles based upon a difference between the intensity detected at said
15 detecting step and the reference value.

12. The method according to claim 11, wherein said adjusting step adjusts the intensity distribution of the charged-particle beam in such a manner that the intensity detected at said detecting step will become
20 the reference value.

13. The method according to claim 11, further comprising:

a measuring step of measuring the intensity distribution of the charged-particle beam on the
25 substrate to be exposed; and

a setting step of setting the intensity of the charged-particle beam, which has been detected by said

detector, to the reference value after the intensity distribution of the charged-particle beam has been adjusted to uniformity based upon the intensity distribution measured at said measuring step.

5 14. The method according to claim 11, wherein said adjusting step halts processing for exposing the substrate and executes adjustment of the intensity distribution of the charged-particle beam if the difference between the intensity detected at said
10 detecting step and the reference value exceeds an allowable value.

15 15. The method according to claim 9, further comprising a plate having a plurality of apertures for dividing the charged-particle beam from said charged-particle source into a plurality of charged-particle beams used in exposing the substrate;

wherein said detecting step detects the intensity of the charged-particle beam, which irradiates said plate, at a plurality of locations in a portion where
20 the plurality of apertures are non-existent.

16. The method according to claim 9, wherein said charged-particle-beam exposure apparatus has a stencil mask for allowing the charged-particle beam from said charged-particle source to pass through in accordance
25 with a pattern and expose the substrate;

said detecting step detecting the intensity of the charged-particle beam at a plurality of locations

in an area of the stencil mask other than an area in which the pattern is present.